Analytical Laboratory

13339 Hagers Ferry Road
Huntersville, NC 28078-7929
McGuire Nuclear Complex - MG03A2
Phone: 980-875-5245 Fax: 980-875-4349

Order Summary Report

Order Number: **J12110391**

Project Name: Flex Fuel WW

Customer Name(s): Bill K, Wayne C, Melonie M, and Tom J

Customer Address: 3195 Pine Hall Rd
Mailcode: Belews Steam Station
Belews Creek, NC 28012

Lab Contact: Jason C Perkins Phone: 980-875-5348

Report Authorized By: (Signature) Digitally signed by jay perkins DN: cn=jay perkins, o=Analytical Lab, ou, email=jay.perkins@duke-energy.com, c=US Date: 2012.12.17 10:15:41 -05'00' **Date:** 12/17/2012

Program Comments:

Please contact the Program Manager (Jason C Perkins) with any questions regarding this report.

Data Flags & Calculations:

Any analytical tests or individual analytes within a test flagged with a Qualifier indicate a deviation from the method quality system or quality control requirement. The qualifier description is found at the end of the Certificate of Analysis (sample results) under the qualifiers heading. All results are reported on a dry weight basis unless otherwise noted. Subcontracted data included on the Duke Certificate of Analysis is to be used as information only. Certified vendor results can be found in the subcontracted lab final report. Duke Energy Analytical Laboratory subcontracts analyses to other vendor laboratories that have been qualified by Duke Energy to perform these analyses except where noted.

Data Package:

This data package includes analytical results that are applicable only to the samples described in this narrative. An estimation of the uncertainty of measurement for the results in the report is available upon request. This report shall not be reproduced, except in full, without the written consent of the Analytical Laboratory. Please contact the Analytical laboratory with any questions. The order of individual sections within this report is as follows:

Job Summary Report, Sample Identification, Technical Validation of Data Package, Analytical Laboratory Certificate of Analysis, Analytical Laboratory QC Reports, Sub-contracted Laboratory Results, Customer Specific Data Sheets, Reports & Documentation, Customer Database Entries, Test Case Narratives, Chain of Custody (COC)

Certification:

The Analytical Laboratory holds the following State Certifications : North Carolina (DENR) Certificate #248, South Carolina (DHEC) Laboratory ID # 99005. Contact the Analytical Laboratory for definitive information about the certification status of specific methods.

Sample ID's & Descriptions:

Sample ID	Plant/Station	Collection Date and Time	Collected By	Sample Description
2012025290	BELEWS	23-Nov-12 7:30 AM	TRAVIS THORNTON	FGD Purge Eff
2012025291	BELEWS	23-Nov-12 7:35 AM	TRAVIS THORNTON	EQ TANK
2012025292	BELEWS	23-Nov-12 7:40 AM	TRAVIS THORNTON	BIOREACTOR 1 INF
2012025293	BELEWS	23-Nov-12 7:40 AM	TRAVIS THORNTON	biOREACTOR 1 INF HG BLK
2012025294	BELEWS	23-Nov-12 7:45 AM	TRAVIS THORNTON	BIOREACTOR 2 INF.
2012025295	BELEWS	23-Nov-12 7:45 AM	TRAVIS THORNTON	BIOREACTOR 2 INF. HG BLANK
2012025296	BELEWS	23-Nov-12 7:50 AM	TRAVIS THORNTON	BIOREACTOR 2 EFF.
2012025297	BELEWS	23-Nov-12 7:50 AM	TRAVIS THORNTON	BIOREACTOR 2 EFF. HG BLANK
2012025298	BELEWS	23-Nov-12 8:00 AM	TRAVIS THORNTON	FILTER BLANK

9 Total Samples

Technical Validation Review

Checklist:

COC and .pdf report are in agreement with sample totals and analyses (compliance programs and procedures).	☑ Yes	☐ No
All Results are less than the laboratory reporting limits.	☐ Yes	☑ No
All laboratory QA/QC requirements are acceptable.	☑ Yes	☐ No

Report Sections Included:

- ☑ Job Summary Report
- ☑ Sample Identification
- ☑ Technical Validation of Data Package
- ☑ Analytical Laboratory Certificate of Analysis
- ☐ Analytical Laboratory QC Report
- ☑ Sub-contracted Laboratory Results
- ☐ Customer Specific Data Sheets, Reports, & Documentation
- ☐ Customer Database Entries
- ☑ Chain of Custody
- ☑ Electronic Data Deliverable (EDD) Sent Separately

Reviewed By: DBA Account Date: 12/17/2012

Certificate of Laboratory Analysis

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Order # J12110391

Site: FGD Purge Eff
Collection Date: 23-Nov-12 7:30 AM

Sample #: 2012025290
Matrix: OTHER

Analyte	Result	Units	Qualifiers	RDL	DF	Method	Analysis Date/Time	Analyst
INORGANIC IONS BY IC								
Bromide	**110**	mg/L		5	50	EPA 300.0	12/04/2012 14:52	JAHERMA
Chloride	**7500**	mg/L		100	1000	EPA 300.0	12/04/2012 14:52	JAHERMA
Sulfate	**1400**	mg/L		100	1000	EPA 300.0	12/04/2012 14:52	JAHERMA
MERCURY (COLD VAPOR) IN WATER								
Mercury (Hg)	**179**	ug/L		5	100	EPA 245.1	11/29/2012 15:29	AGIBBS
DISSOLVED METALS BY ICP								
Manganese (Mn)	**10.1**	mg/L		0.05	10	EPA 200.7	12/04/2012 11:23	MHH7131
TOTAL RECOVERABLE METALS BY ICP								
Boron (B)	**230**	mg/L		0.5	10	EPA 200.7	12/05/2012 13:18	DJSULL1
Calcium (Ca)	**4100**	mg/L		0.1	10	EPA 200.7	12/05/2012 13:18	DJSULL1
Iron (Fe)	**141**	mg/L		0.1	10	EPA 200.7	12/05/2012 13:18	DJSULL1
Magnesium (Mg)	**884**	mg/L		0.05	10	EPA 200.7	12/05/2012 13:18	DJSULL1
Manganese (Mn)	**11.0**	mg/L		0.05	10	EPA 200.7	12/05/2012 13:18	DJSULL1
DISSOLVED METALS BY ICP-MS								
Selenium (Se)	**284**	ug/L		10	10	EPA 200.8	12/03/2012 15:13	KRICHAR
TOTAL RECOVERABLE METALS BY ICP-MS								
Arsenic (As)	**266**	ug/L		10	10	EPA 200.8	12/04/2012 11:25	KRICHAR
Cadmium (Cd)	**< 10**	ug/L		10	10	EPA 200.8	12/04/2012 11:25	KRICHAR
Chromium (Cr)	**248**	ug/L		10	10	EPA 200.8	12/04/2012 11:25	KRICHAR
Copper (Cu)	**142**	ug/L		10	10	EPA 200.8	12/04/2012 11:25	KRICHAR
Nickel (Ni)	**224**	ug/L		10	10	EPA 200.8	12/04/2012 11:25	KRICHAR
Selenium (Se)	**4070**	ug/L		10	10	EPA 200.8	12/04/2012 11:25	KRICHAR
Silver (Ag)	**< 10**	ug/L		10	10	EPA 200.8	12/04/2012 11:25	KRICHAR
Zinc (Zn)	**269**	ug/L		10	10	EPA 200.8	12/04/2012 11:25	KRICHAR
SELENIUM SPECIATION - (Analysis Performed by Applied Speciation and Consulting, LLC)								
Vendor Parameter	**Complete**					Vendor Method		V_AS&C
TOTAL DISSOLVED SOLIDS								
TDS	**19000**	mg/L		200	1	SM2540C	11/28/2012 15:53	SWILLI3
TOTAL SUSPENDED SOLIDS								
TSS	**3500**	mg/L		250	1	SM2540D	11/30/2012 13:05	TJA7067

Certificate of Laboratory Analysis

Order # J12110391

Site: EQ TANK **Sample #: 2012025291**

Collection Date: 23-Nov-12 7:35 AM Matrix: OTHER

Analyte	Result	Units	Qualifiers	RDL	DF	Method	Analysis Date/Time	Analyst
MERCURY (COLD VAPOR) IN WATER								
Mercury (Hg)	**133**	ug/L		2.5	50	EPA 245.1	11/29/2012 15:32	AGIBBS
DISSOLVED METALS BY ICP								
Manganese (Mn)	**8.71**	mg/L		0.05	10	EPA 200.7	12/04/2012 11:27	MHH7131
TOTAL RECOVERABLE METALS BY ICP								
Boron (B)	**220**	mg/L		0.5	10	EPA 200.7	12/05/2012 13:22	DJSULL1
Calcium (Ca)	**4360**	mg/L		0.1	10	EPA 200.7	12/05/2012 13:22	DJSULL1
Iron (Fe)	**125**	mg/L		0.1	10	EPA 200.7	12/05/2012 13:22	DJSULL1
Magnesium (Mg)	**866**	mg/L		0.05	10	EPA 200.7	12/05/2012 13:22	DJSULL1
Manganese (Mn)	**9.76**	mg/L		0.05	10	EPA 200.7	12/05/2012 13:22	DJSULL1
DISSOLVED METALS BY ICP-MS								
Selenium (Se)	**261**	ug/L		10	10	EPA 200.8	12/03/2012 15:16	KRICHAR
TOTAL RECOVERABLE METALS BY ICP-MS								
Arsenic (As)	**224**	ug/L		10	10	EPA 200.8	12/04/2012 11:29	KRICHAR
Cadmium (Cd)	**< 10**	ug/L		10	10	EPA 200.8	12/04/2012 11:29	KRICHAR
Chromium (Cr)	**269**	ug/L		10	10	EPA 200.8	12/04/2012 11:29	KRICHAR
Copper (Cu)	**158**	ug/L		10	10	EPA 200.8	12/04/2012 11:29	KRICHAR
Nickel (Ni)	**244**	ug/L		10	10	EPA 200.8	12/04/2012 11:29	KRICHAR
Selenium (Se)	**3540**	ug/L		10	10	EPA 200.8	12/04/2012 11:29	KRICHAR
Silver (Ag)	**< 10**	ug/L		10	10	EPA 200.8	12/04/2012 11:29	KRICHAR
Zinc (Zn)	**291**	ug/L		10	10	EPA 200.8	12/04/2012 11:29	KRICHAR

Site: BIOREACTOR 1 INF **Sample #: 2012025292**

Collection Date: 23-Nov-12 7:40 AM Matrix: OTHER

Analyte	Result	Units	Qualifiers	RDL	DF	Method	Analysis Date/Time	Analyst
MERCURY 1631 - (Analysis Performed by Brooks Rand Labs LLC)								
Vendor Parameter	**Complete**					Vendor Method		V_BRAND
DISSOLVED METALS BY ICP								
Manganese (Mn)	**2.00**	mg/L		0.05	10	EPA 200.7	12/04/2012 11:31	MHH7131
TOTAL RECOVERABLE METALS BY ICP								
Boron (B)	**189**	mg/L		0.5	10	EPA 200.7	12/05/2012 13:26	DJSULL1
Calcium (Ca)	**3310**	mg/L		0.1	10	EPA 200.7	12/05/2012 13:26	DJSULL1
Iron (Fe)	**< 0.1**	mg/L		0.1	10	EPA 200.7	12/05/2012 13:26	DJSULL1
Magnesium (Mg)	**742**	mg/L		0.05	10	EPA 200.7	12/05/2012 13:26	DJSULL1
Manganese (Mn)	**2.03**	mg/L		0.05	10	EPA 200.7	12/05/2012 13:26	DJSULL1

Certificate of Laboratory Analysis

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Order # J12110391

Site: BIOREACTOR 1 INF **Sample #: 2012025292**

Collection Date: 23-Nov-12 7:40 AM Matrix: OTHER

Analyte	Result	Units	Qualifiers	RDL	DF	Method	Analysis Date/Time	Analyst
DISSOLVED METALS BY ICP-MS								
Selenium (Se)	**186**	ug/L		10	10	EPA 200.8	12/03/2012 15:19	KRICHAR
TOTAL RECOVERABLE METALS BY ICP-MS								
Arsenic (As)	**< 10**	ug/L		10	10	EPA 200.8	12/04/2012 11:32	KRICHAR
Cadmium (Cd)	**< 10**	ug/L		10	10	EPA 200.8	12/04/2012 11:32	KRICHAR
Chromium (Cr)	**< 10**	ug/L		10	10	EPA 200.8	12/04/2012 11:32	KRICHAR
Copper (Cu)	**< 10**	ug/L		10	10	EPA 200.8	12/04/2012 11:32	KRICHAR
Nickel (Ni)	**19.5**	ug/L		10	10	EPA 200.8	12/04/2012 11:32	KRICHAR
Selenium (Se)	**183**	ug/L		10	10	EPA 200.8	12/04/2012 11:32	KRICHAR
Silver (Ag)	**< 10**	ug/L		10	10	EPA 200.8	12/04/2012 11:32	KRICHAR
Zinc (Zn)	**< 10**	ug/L		10	10	EPA 200.8	12/04/2012 11:32	KRICHAR
SELENIUM SPECIATION - (Analysis Performed by Applied Speciation and Consulting, LLC)								
Vendor Parameter	**Complete**					Vendor Method		V_AS&C

Site: biOREACTOR 1 INF HG BLK **Sample #: 2012025293**

Collection Date: 23-Nov-12 7:40 AM Matrix: OTHER

Analyte	Result	Units	Qualifiers	RDL	DF	Method	Analysis Date/Time	Analyst
MERCURY 1631 - (Analysis Performed by Brooks Rand Labs LLC)								
Vendor Parameter	**Complete**					Vendor Method		V_BRAND

Site: BIOREACTOR 2 INF. **Sample #: 2012025294**

Collection Date: 23-Nov-12 7:45 AM Matrix: OTHER

Analyte	Result	Units	Qualifiers	RDL	DF	Method	Analysis Date/Time	Analyst
MERCURY 1631 - (Analysis Performed by Brooks Rand Labs LLC)								
Vendor Parameter	**Complete**					Vendor Method		V_BRAND
DISSOLVED METALS BY ICP								
Manganese (Mn)	**1.61**	mg/L		0.05	10	EPA 200.7	12/04/2012 11:35	MHH7131
TOTAL RECOVERABLE METALS BY ICP								
Boron (B)	**188**	mg/L		0.5	10	EPA 200.7	12/05/2012 13:30	DJSULL1
Calcium (Ca)	**3380**	mg/L		0.1	10	EPA 200.7	12/05/2012 13:30	DJSULL1
Iron (Fe)	**0.220**	mg/L		0.1	10	EPA 200.7	12/05/2012 13:30	DJSULL1
Magnesium (Mg)	**744**	mg/L		0.05	10	EPA 200.7	12/05/2012 13:30	DJSULL1
Manganese (Mn)	**1.68**	mg/L		0.05	10	EPA 200.7	12/05/2012 13:30	DJSULL1

Certificate of Laboratory Analysis

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Order # J12110391

Site: BIOREACTOR 2 INF. **Sample #: 2012025294**

Collection Date: 23-Nov-12 7:45 AM Matrix: OTHER

Analyte	Result	Units	Qualifiers	RDL	DF	Method	Analysis Date/Time	Analyst
DISSOLVED METALS BY ICP-MS								
Selenium (Se)	**< 10**	ug/L		10	10	EPA 200.8	12/03/2012 15:22	KRICHAR
TOTAL RECOVERABLE METALS BY ICP-MS								
Arsenic (As)	**< 10**	ug/L		10	10	EPA 200.8	12/04/2012 11:35	KRICHAR
Cadmium (Cd)	**< 10**	ug/L		10	10	EPA 200.8	12/04/2012 11:35	KRICHAR
Chromium (Cr)	**< 10**	ug/L		10	10	EPA 200.8	12/04/2012 11:35	KRICHAR
Copper (Cu)	**< 10**	ug/L		10	10	EPA 200.8	12/04/2012 11:35	KRICHAR
Nickel (Ni)	**< 10**	ug/L		10	10	EPA 200.8	12/04/2012 11:35	KRICHAR
Selenium (Se)	**15.4**	ug/L		10	10	EPA 200.8	12/04/2012 11:35	KRICHAR
Silver (Ag)	**< 10**	ug/L		10	10	EPA 200.8	12/04/2012 11:35	KRICHAR
Zinc (Zn)	**< 10**	ug/L		10	10	EPA 200.8	12/04/2012 11:35	KRICHAR
SELENIUM SPECIATION - (Analysis Performed by Applied Speciation and Consulting, LLC)								
Vendor Parameter	**Complete**					Vendor Method		V_AS&C

Site: BIOREACTOR 2 INF. HG BLANK **Sample #: 2012025295**

Collection Date: 23-Nov-12 7:45 AM Matrix: OTHER

Analyte	Result	Units	Qualifiers	RDL	DF	Method	Analysis Date/Time	Analyst
MERCURY 1631 - (Analysis Performed by Brooks Rand Labs LLC)								
Vendor Parameter	**Complete**					Vendor Method		V_BRAND

Site: BIOREACTOR 2 EFF. **Sample #: 2012025296**

Collection Date: 23-Nov-12 7:50 AM Matrix: OTHER

Analyte	Result	Units	Qualifiers	RDL	DF	Method	Analysis Date/Time	Analyst
INORGANIC IONS BY IC								
Bromide	**95**	mg/L		5	50	EPA 300.0	12/04/2012 15:11	JAHERMA
Chloride	**6800**	mg/L		100	1000	EPA 300.0	12/04/2012 15:11	JAHERMA
Sulfate	**1700**	mg/L		100	1000	EPA 300.0	12/04/2012 15:11	JAHERMA
MERCURY 1631 - (Analysis Performed by Brooks Rand Labs LLC)								
Vendor Parameter	**Complete**					Vendor Method		V_BRAND
DISSOLVED METALS BY ICP								
Manganese (Mn)	**1.62**	mg/L		0.05	10	EPA 200.7	12/04/2012 11:38	MHH7131

Certificate of Laboratory Analysis

Order # J12110391

Site: BIOREACTOR 2 EFF. **Sample #: 2012025296**

Collection Date: 23-Nov-12 7:50 AM Matrix: OTHER

Analyte	Result	Units	Qualifiers	RDL	DF	Method	Analysis Date/Time	Analyst
TOTAL RECOVERABLE METALS BY ICP								
Boron (B)	**183**	mg/L		0.5	10	EPA 200.7	12/05/2012 13:34	DJSULL1
Calcium (Ca)	**3290**	mg/L		0.1	10	EPA 200.7	12/05/2012 13:34	DJSULL1
Iron (Fe)	**0.200**	mg/L		0.1	10	EPA 200.7	12/05/2012 13:34	DJSULL1
Magnesium (Mg)	**711**	mg/L		0.05	10	EPA 200.7	12/05/2012 13:34	DJSULL1
Manganese (Mn)	**1.67**	mg/L		0.05	10	EPA 200.7	12/05/2012 13:34	DJSULL1
DISSOLVED METALS BY ICP-MS								
Selenium (Se)	**5.07**	ug/L		5	5	EPA 200.8	12/03/2012 15:26	KRICHAR
TOTAL RECOVERABLE METALS BY ICP-MS								
Arsenic (As)	**< 5**	ug/L		5	5	EPA 200.8	12/04/2012 11:39	KRICHAR
Cadmium (Cd)	**< 5**	ug/L		5	5	EPA 200.8	12/04/2012 11:39	KRICHAR
Chromium (Cr)	**< 5**	ug/L		5	5	EPA 200.8	12/04/2012 11:39	KRICHAR
Copper (Cu)	**< 5**	ug/L		5	5	EPA 200.8	12/04/2012 11:39	KRICHAR
Nickel (Ni)	**< 5**	ug/L		5	5	EPA 200.8	12/04/2012 11:39	KRICHAR
Selenium (Se)	**9.27**	ug/L		5	5	EPA 200.8	12/04/2012 11:39	KRICHAR
Silver (Ag)	**< 5**	ug/L		5	5	EPA 200.8	12/04/2012 11:39	KRICHAR
Zinc (Zn)	**< 5**	ug/L		5	5	EPA 200.8	12/04/2012 11:39	KRICHAR
SELENIUM SPECIATION - (Analysis Performed by Applied Speciation and Consulting, LLC)								
Vendor Parameter	**Complete**					Vendor Method		V_AS&C

Site: BIOREACTOR 2 EFF. HG BLANK **Sample #: 2012025297**

Collection Date: 23-Nov-12 7:50 AM Matrix: OTHER

Analyte	Result	Units	Qualifiers	RDL	DF	Method	Analysis Date/Time	Analyst
MERCURY 1631 - (Analysis Performed by Brooks Rand Labs LLC)								
Vendor Parameter	**Complete**					Vendor Method		V_BRAND

Site: FILTER BLANK **Sample #: 2012025298**

Collection Date: 23-Nov-12 8:00 AM Matrix: OTHER

Analyte	Result	Units	Qualifiers	RDL	DF	Method	Analysis Date/Time	Analyst
DISSOLVED METALS BY ICP								
Manganese (Mn)	**< 0.005**	mg/L		0.005	1	EPA 200.7	12/04/2012 11:15	MHH7131
DISSOLVED METALS BY ICP-MS								
Selenium (Se)	**< 1**	ug/L		1	1	EPA 200.8	12/03/2012 14:44	KRICHAR

December 14, 2012

Duke Energy
ATTN: Jay Perkins
Scientific Support-Laboratory
13339 Hagers Ferry Road
Huntersville NC 28078
jcperkins@duke-energy.com
labcustomer@duke-energy.com

RE: Project DUK-HV1201 Client Project: J12110391

Dear Mr. Perkins,

On November 30, 2012, Brooks Rand Labs (BRL) received three (3) wastewater samples and three (3) corresponding field blanks. An aliquot was removed from each sample bottle and filtered into a separate container designed for dissolved mercury (Hg) analysis. The sample volume from the original container was logged-in for total Hg analysis. All samples were received, prepared, analyzed, and stored according to BRL SOPs and EPA methodology.

Data used for regulatory purposes has a 24 hour filtration holding time requirement. Non-regulatory purposed data has a 48 hour filtration holding time. The samples were received outside of the 48 hour filtration requirement and the results were qualified **H**.

The results were blank-corrected as described in the calculations section of the relevant SOP and may have been evaluated using reporting limits that have been adjusted to account for sample aliquot size. Please refer to the *Sample Results* page for sample-specific MDLs, MRLs, and other details. Aside from concentration qualifiers, all data was reported without further qualification and all associated quality control sample results met the acceptance criteria.

BRL, an accredited laboratory, certifies the reported results of all analyses for which BRL is NELAP accredited meet all NELAP requirements. For more details, see the *Report Information* page of the report.

Please feel free to contact us if you have any questions regarding this report.

Sincerely,

Tiffany Stilwater
Project Manager
tiffany@brooksrand.com

Mi Sun Um
Data Manager
misun@brooksrand.com

Project ID: DUK-HV1201
PM: Tiffany Stilwater

Client PM: Jay Perkins
Client PO: 141391

Report Information

Laboratory Accreditation

BRL is accredited by the *National Environmental Laboratory Accreditation Program* (NELAP) through the State of Florida Department of Health, Bureau of Laboratories (E87982) and is certified to perform many environmental analyses. BRL is also certified by many other states to perform environmental analyses. For a current list of our accreditations /certifications, please visit our website at <http://www.brooksrand.com/default.asp?contentID=586>. Results reported relate only to the samples listed in the report.

Field Quality Control Samples

Please be notified that certain EPA methods require the collection of field quality control samples of an appropriate type and frequency; failure to do so is considered a deviation from some methods and for compliance purposes should only be done with the approval of regulatory authorities. Please see the specific EPA methods for details regarding required field quality control samples.

Common Abbreviations

BLK	method blank	**MS**	matrix spike
BRL	Brooks Rand Labs	**MSD**	matrix spike duplicate
BS	laboratory fortified blank	**ND**	non-detect
CAL	calibration standard	**NR**	non-reportable
CCV	continuing calibration verification	**PS**	post preparation spike
COC	chain of custody record	**REC**	percent recovery
CRM	certified reference material	**RPD**	relative percent difference
D	dissolved fraction	**RSD**	relative standard deviation
DUP	duplicate	**SCV**	secondary calibration verification
ICV	initial calibration verification	**SOP**	standard operating procedure
MDL	method detection limit	**SRM**	standard reference material
MRL	method reporting limit	**T**	total recoverable fraction

Definition of Data Qualifiers

(Effective 9/23/09)

B Detected by the instrument, the result is > the MDL but ≤ the MRL. Result is reported and considered an estimate.
E An estimated value due to the presence of interferences. A full explanation is presented in the narrative.
H Holding time and/or preservation requirements not met. Result is estimated.
J Estimated value. A full explanation is presented in the narrative.
J-M Duplicate precision (RPD) for associated QC sample was not within acceptance criteria. Result is estimated.
J-N Spike recovery for associated QC sample was not within acceptance criteria. Result is estimated.
M Duplicate precision (RPD) was not within acceptance criteria. Result is estimated.
N Spike recovery was not within acceptance criteria. Result is estimated.
R Rejected, unusable value. A full explanation is presented in the narrative.
U Result is ≤ the MDL or client requested reporting limit (CRRL). Result reported as the MDL or CRRL.
X Result is not BLK-corrected and is within 10x the absolute value of the highest detectable BLK in the batch. Result is estimated.

These qualifiers are based on those previously utilized by Brooks Rand Labs, those found in the EPA SOW ILM03.0, Exhibit B, Section III, pg. B-18, and the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review; USEPA; January 2010. These supersede all previous qualifiers ever employed by BRL.

Project ID: DUK-HV1201
PM: Tiffany Stilwater

Client PM: Jay Perkins
Client PO: 141391

Sample Information

Sample	Lab ID	Report Matrix	Type	Sampled	Received
BioReactor 1 Inf	1248035-01	Influent	Sample	11/23/2012	11/30/2012
BioReactor 1 Inf	1248035-02	Influent	Sample	11/23/2012	11/30/2012
BioReactor 1 Inf Hg Blk	1248035-03	DIW	Field Blank	11/23/2012	11/30/2012
BioReactor 1 Inf Hg Blk	1248035-04	DIW	Field Blank	11/23/2012	11/30/2012
BioReactor 2 Inf	1248035-05	Influent	Sample	11/23/2012	11/30/2012
BioReactor 2 Inf	1248035-06	Influent	Sample	11/23/2012	11/30/2012
BioReactor 2 Inf Hg Blk	1248035-07	DIW	Field Blank	11/23/2012	11/30/2012
BioReactor 2 Inf Hg Blk	1248035-08	DIW	Field Blank	11/23/2012	11/30/2012
BioReactor 2 Eff	1248035-09	Effluent	Sample	11/23/2012	11/30/2012
BioReactor 2 Eff	1248035-10	Effluent	Sample	11/23/2012	11/30/2012
BioReactor 2 Eff Hg Blk	1248035-11	DIW	Field Blank	11/23/2012	11/30/2012
BioReactor 2 Eff Hg Blk	1248035-12	DIW	Field Blank	11/23/2012	11/30/2012

Batch Summary

Analyte	Lab Matrix	Method	Prepared	Analyzed	Batch	Sequence
Hg	Water	EPA 1631	12/05/2012	12/10/2012	B122262	1200914

Project ID: DUK-HV1201
PM: Tiffany Stilwater

Client PM: Jay Perkins
Client PO: 141391

Sample Results

Sample	Analyte	Report Matrix	Basis	Result	Qualifier	MDL	MRL	Unit	Batch	Sequence
BioReactor 1 Inf										
1248035-01	Hg	Influent	T	68.7		3.79	10.1	ng/L	B122262	1200914
1248035-02	Hg	Influent	D	44.1	H	0.76	2.02	ng/L	B122262	1200914
BioReactor 1 Inf Hg Blk										
1248035-03	Hg	DIW	T	0.16	U	0.16	0.42	ng/L	B122262	1200914
1248035-04	Hg	DIW	D	0.15	H, U	0.15	0.41	ng/L	B122262	1200914
BioReactor 2 Eff										
1248035-09	Hg	Effluent	T	9.48		0.15	0.40	ng/L	B122262	1200914
1248035-10	Hg	Effluent	D	0.87	H	0.15	0.40	ng/L	B122262	1200914
BioReactor 2 Eff Hg Blk										
1248035-11	Hg	DIW	T	0.15	U	0.15	0.41	ng/L	B122262	1200914
1248035-12	Hg	DIW	D	0.15	H, U	0.15	0.41	ng/L	B122262	1200914
BioReactor 2 Inf										
1248035-05	Hg	Influent	T	30.5		0.38	1.02	ng/L	B122262	1200914
1248035-06	Hg	Influent	D	3.90	H	0.15	0.40	ng/L	B122262	1200914
BioReactor 2 Inf Hg Blk										
1248035-07	Hg	DIW	T	0.15	U	0.15	0.39	ng/L	B122262	1200914
1248035-08	Hg	DIW	D	0.15	H, U	0.15	0.41	ng/L	B122262	1200914

Project ID: DUK-HV1201
PM: Tiffany Stilwater

Client PM: Jay Perkins
Client PO: 141391

Accuracy & Precision Summary

Batch: B122262
Lab Matrix: Water
Method: EPA 1631

Sample	Analyte	Native	Spike	Result	Units	REC & Limits	RPD & Limits
B122262-SRM1	**Certified Reference Material (1249026, NIST 1641d 1000x dilution)**						
	Hg		15.68	15.95	ng/L	102% 85-115	
B122262-MS1	**Matrix Spike (1248031-05)**						
	Hg	10.71	44.75	51.48	ng/L	91% 71-125	
B122262-MSD1	**Matrix Spike Duplicate (1248031-05)**						
	Hg	10.71	45.65	48.72	ng/L	83% 71-125	6% 24
B122262-MS2	**Matrix Spike (1248033-01)**						
	Hg	135.7	505.1	650.0	ng/L	102% 71-125	
B122262-MSD2	**Matrix Spike Duplicate (1248033-01)**						
	Hg	135.7	505.1	659.9	ng/L	104% 71-125	2% 24

Project ID: DUK-HV1201
PM: Tiffany Stilwater

Client PM: Jay Perkins
Client PO: 141391

Method Blanks & Reporting Limits

Batch: B122262
Matrix: Water
Method: EPA 1631
Analyte: Hg

Sample	Result	Units
B122262-BLK1	0.12	ng/L
B122262-BLK2	0.14	ng/L
B122262-BLK3	0.15	ng/L
B122262-BLK4	0.17	ng/L

Average: 0.15 **Standard Deviation:** 0.02 **MDL:** 0.15
Limit: 0.50 **Limit:** 0.10 **MRL:** 0.40

Project ID: DUK-HV1201
PM: Tiffany Stilwater

Client PM: Jay Perkins
Client PO: 141391

Instrument Calibration

Sequence: 1200914
Instrument: THG-05
Date: 12/10/2012
Analyte: Hg

Total Mercury and Mercury Speciation by CVAFS
Method: EPA 1631

Lab ID	True Value	Result	Units	REC & Limits	
1200914-IBL1		1.82	pg of Hg		
1200914-IBL2		3.61	pg of Hg		
1200914-IBL3		3.80	pg of Hg		
1200914-IBL4		3.96	pg of Hg		
1200914-CAL1	10.00	10.15	pg of Hg	101%	
1200914-CAL2	25.00	25.89	pg of Hg	104%	
1200914-CAL3	100.0	97.30	pg of Hg	97%	
1200914-CAL4	500.0	490.6	pg of Hg	98%	
1200914-CAL5	2500	2540	pg of Hg	102%	
1200914-CAL6	10000	9830	pg of Hg	98%	
1200914-ICV1	1568	1595	pg of Hg	102%	85-115
1200914-CCB1		9.35	pg of Hg		
1200914-CCV1	500.0	510.7	pg of Hg	102%	77-123
1200914-CCB2		6.14	pg of Hg		
1200914-CCB3		6.21	pg of Hg		
1200914-CCB4		5.47	pg of Hg		
1200914-CCV2	500.0	515.7	pg of Hg	103%	77-123
1200914-CCB5		8.05	pg of Hg		
1200914-CCV3	500.0	522.1	pg of Hg	104%	77-123
1200914-CCB6		7.24	pg of Hg		
1200914-CCV4	500.0	527.7	pg of Hg	106%	77-123
1200914-CCB7		7.46	pg of Hg		
1200914-CCV5	500.0	519.9	pg of Hg	104%	77-123
1200914-CCB8		6.08	pg of Hg		
1200914-CCV6	500.0	512.8	pg of Hg	103%	77-123
1200914-CCB9		6.65	pg of Hg		
1200914-CCV7	500.0	513.0	pg of Hg	103%	77-123
1200914-CCBA		5.48	pg of Hg		
1200914-CCV8	500.0	513.4	pg of Hg	103%	77-123
1200914-CCBB		5.91	pg of Hg		
1200914-CCV9	500.0	508.0	pg of Hg	102%	77-123
1200914-CCBC		5.61	pg of Hg		
1200914-CCVA	500.0	511.3	pg of Hg	102%	77-123
1200914-CCBD		5.10	pg of Hg		
1200914-CCVB	500.0	504.0	pg of Hg	101%	77-123
1200914-CCBE		4.77	pg of Hg		
1200914-CCVC	500.0	502.3	pg of Hg	100%	77-123
1200914-CCBF		5.93	pg of Hg		
1200914-CCVD	500.0	501.9	pg of Hg	100%	77-123
1200914-CCBG		5.30	pg of Hg		

Project ID: DUK-HV1201
PM: Tiffany Stilwater

Client PM: Jay Perkins
Client PO: 141391

Instrument Calibration

Sequence: 1200914
Instrument: THG-05
Date: 12/10/2012
Analyte: Hg

Total Mercury and Mercury Speciation by CVAFS
Method: EPA 1631

Lab ID	True Value	Result	Units	REC & Limits	
1200914-CCVE	500.0	502.4	pg of Hg	100%	77-123
1200914-CCBH		7.85	pg of Hg		
1200914-CCVF	500.0	509.5	pg of Hg	102%	77-123
1200914-CCBI		6.96	pg of Hg		
1200914-CCVG	500.0	500.3	pg of Hg	100%	77-123
1200914-CCBJ		9.76	pg of Hg		
1200914-CCVH	500.0	502.7	pg of Hg	101%	77-123
1200914-CCBK		5.67	pg of Hg		
1200914-CCVI	500.0	510.6	pg of Hg	102%	77-123
1200914-CCBL		5.36	pg of Hg		
1200914-CCVJ	500.0	519.9	pg of Hg	104%	77-123
1200914-CCBM		6.16	pg of Hg		
1200914-CCVK	500.0	514.7	pg of Hg	103%	77-123
1200914-CCBN		5.66	pg of Hg		
1200914-ICV2	1568	1685	pg of Hg	107%	85-115
1200914-CCVL	500.0	522.4	pg of Hg	104%	77-123
1200914-CCBO		4.57	pg of Hg		
1200914-CCVM	500.0	525.9	pg of Hg	105%	77-123
1200914-CCBP		3.60	pg of Hg		
1200914-CCVN	500.0	523.0	pg of Hg	105%	77-123
1200914-CCBQ		5.87	pg of Hg		

Project ID: DUK-HV1201
PM: Tiffany Stilwater

Client PM: Jay Perkins
Client PO: 141391

Sample Containers

Lab ID: 1248035-01
Sample: BioReactor 1 Inf
Report Matrix: Influent
Sample Type: Sample
Collected: 11/23/2012
Received: 11/30/2012

Des	Container	Size	Lot	Preservation	P-Lot	pH	Ship. Cont.
A	Bottle FLPE Hg-T	500 mL	71666330 10	none	n/a		Cooler

Lab ID: 1248035-02
Sample: BioReactor 1 Inf
Comments: Qualify H
Report Matrix: Influent
Sample Type: Sample
Collected: 11/23/2012
Received: 11/30/2012

Des	Container	Size	Lot	Preservation	P-Lot	pH	Ship. Cont.
A	Bottle FLPE Hg-T	250 mL	71691270 10	none	n/a		Cooler

Lab ID: 1248035-03
Sample: BioReactor 1 Inf Hg Blk
Report Matrix: DIW
Sample Type: Field Blank
Collected: 11/23/2012
Received: 11/30/2012

Des	Container	Size	Lot	Preservation	P-Lot	pH	Ship. Cont.
A	Bottle FLPE Hg-T	500 mL	71666330 10	none	n/a		Cooler

Lab ID: 1248035-04
Sample: BioReactor 1 Inf Hg Blk
Comments: Qualify H
Report Matrix: DIW
Sample Type: Field Blank
Collected: 11/23/2012
Received: 11/30/2012

Des	Container	Size	Lot	Preservation	P-Lot	pH	Ship. Cont.
A	Bottle FLPE Hg-T	250 mL	71691270 10	none	n/a		Cooler

Lab ID: 1248035-05
Sample: BioReactor 2 Inf
Report Matrix: Influent
Sample Type: Sample
Collected: 11/23/2012
Received: 11/30/2012

Des	Container	Size	Lot	Preservation	P-Lot	pH	Ship. Cont.
A	Bottle FLPE Hg-T	500 mL	71666330 10	none	n/a		Cooler

Lab ID: 1248035-06
Sample: BioReactor 2 Inf
Comments: Qualify H
Report Matrix: Influent
Sample Type: Sample
Collected: 11/23/2012
Received: 11/30/2012

Des	Container	Size	Lot	Preservation	P-Lot	pH	Ship. Cont.
A	Bottle FLPE Hg-T	250 mL	71691270 10	none	n/a		Cooler

Project ID: DUK-HV1201
PM: Tiffany Stilwater

Client PM: Jay Perkins
Client PO: 141391

Sample Containers

Lab ID: 1248035-07
Sample: BioReactor 2 Inf Hg Blk
Report Matrix: DIW
Sample Type: Field Blank
Collected: 11/23/2012
Received: 11/30/2012

Des	Container	Size	Lot	Preservation	P-Lot	pH	Ship. Cont.
A	Bottle FLPE Hg-T	500 mL	71666330 10	none	n/a		Cooler

Lab ID: 1248035-08
Sample: BioReactor 2 Inf Hg Blk
Comments: Qualify H
Report Matrix: DIW
Sample Type: Field Blank
Collected: 11/23/2012
Received: 11/30/2012

Des	Container	Size	Lot	Preservation	P-Lot	pH	Ship. Cont.
A	Bottle FLPE Hg-T	250 mL	71691270 10	none	n/a		Cooler

Lab ID: 1248035-09
Sample: BioReactor 2 Eff
Report Matrix: Effluent
Sample Type: Sample
Collected: 11/23/2012
Received: 11/30/2012

Des	Container	Size	Lot	Preservation	P-Lot	pH	Ship. Cont.
A	Bottle FLPE Hg-T	500 mL	71666330 10	none	n/a		Cooler

Lab ID: 1248035-10
Sample: BioReactor 2 Eff
Comments: Qualify H
Report Matrix: Effluent
Sample Type: Sample
Collected: 11/23/2012
Received: 11/30/2012

Des	Container	Size	Lot	Preservation	P-Lot	pH	Ship. Cont.
A	Bottle FLPE Hg-T	250 mL	71691270 10	none	n/a		Cooler

Lab ID: 1248035-11
Sample: BioReactor 2 Eff Hg Blk
Report Matrix: DIW
Sample Type: Field Blank
Collected: 11/23/2012
Received: 11/30/2012

Des	Container	Size	Lot	Preservation	P-Lot	pH	Ship. Cont.
A	Bottle FLPE Hg-T	500 mL	71666330 10	none	n/a		Cooler

Lab ID: 1248035-12
Sample: BioReactor 2 Eff Hg Blk
Comments: Qualify H
Report Matrix: DIW
Sample Type: Field Blank
Collected: 11/23/2012
Received: 11/30/2012

Des	Container	Size	Lot	Preservation	P-Lot	pH	Ship. Cont.
A	Bottle FLPE Hg-T	250 mL	71691270 10	none	n/a		Cooler

Project ID: DUK-HV1201
PM: Tiffany Stilwater

Client PM: Jay Perkins
Client PO: 141391

Shipping Containers

Cooler

Received: November 30, 2012 9:00
Tracking No: 535305196306 via FedEx
Coolant Type: Ice
Temperature: -0.1 °C

Description: Cooler
Damaged in transit? No
Returned to client? No

Custody seals present? No
Custody seals intact? No
COC present? Yes

CHAIN OF CUSTODY RECORD AND ANALYSIS REQUEST FORM

1248035

Duke Energy Analytical Laboratory
Mail Code MGO3A2 (Building 7405)
13339 Hagers Ferry Rd
Huntersville, N. C. 28078
(704) 875-5245
Fax: (704) 875-4349

Analytical Laboratory Use Only

UMS # J 121103a J | Matrix: OTHER | Samples Originating From: NC X SC ___

Logged By: J L | Date & Time: 11/27/12 1058 | SAMPLE PROGRAM: Ground Water ___ NPDES ___ Drinking Water ___ UST ___ RCRA ___ Waste ___

Vendor: | 8.1 Cooler Temp (C)

Vendor: ASC, Brooks Rand

[19]Page 1 of 1

DISTRIBUTION
ORIGINAL to LAB,
COPY to CLIENT

Customer must Complete

1)Project Name: Belews Creek (Flex Fuel) - WW		2)Phone No:
2) Client: Melonie Martin, Wayne Chapman, Tom Johnson, Bill Kennedy		4)Fax No:
5)Project: MBCFFLX01	6)Account:	Mail Code:
8)Oper. Unit: BC01	9)Process: NEXHSTK	10)Activity ID:

MR #:

[15]Preserv.: 1=HCL 2=H_2SO_4 3=HNO_3 4=Ice 5=None

Customer to complete all appropriate non-shaded areas.

Customer to complete appropriate columns to right

LAB USE ONLY [11]Lab ID	Se Speciation Bottle ID	[13]Sample Description or ID	Date	Time	Signature	[17]Comp.	[18]Grab	[16]Analyses Required: TDS, TSS	Hg 1631 total and filtered V_Brand	Metals + Hg 245.1*	Mn (ICP), Se (IMS) filtered	Se, Speciation, V_ASC	Chloride, Sulfate, Bromide, - Dionex
								4	4	3	3	4	4
12N025290		FGD Purge Eff	11-23	7:30				1		1	1	1	1
12N025291		EQ Tank		7:35						1	1		
12N025292		BioReactor 1 Inf		7:40					1	1*	1	1	
12N025293		BioReactor 1 Inf Hg Blk		7:40					1				
12N025294		BioReactor 2 Inf		7:45					1	1*	1	1	
12N025295		BioReactor 2 Inf Hg Blk		7:45					1				
12N025296		BioReactor 2 Eff		7:50					1	1*	1	1	1
12N025297		BioReactor 2 Eff Hg Blk		7:50					1				
12N025298		Filter Blank		08:00							1		
												Filter Mn and Se in the field	
												Lab, return kit to Tom Johnson	

Customer to sign & date below - fill out from left to right.

1) Relinquished By: Travis Thornton	Date/Time: 11-23-12 08:45	2) Accepted By:	Date/Time: 11/27/12 1045
3) Relinquished By:	Date/Time:	4) Accepted By:	Date/Time: 11/30/12 0900
5)Relinquished By:	Date/Time:	6)Accepted By:	Date/Time:
7)Relinquished By:	Date/Time: 11/29/12	8)Accepted By:	Date/Time:
9)Seal/Locked By:	Date/Time: 11/29/12	10) Seal/Lock Opened By	Date/Time:
11)Seal/Locked By:	Date/Time:	12)Seal/Lock Opened By	Date/Time:

Comments: * Metals=TRM/IMS = As, Cd, Cr, Cu, Ni, Se, Ag, Zn TRM/ICP = B, Ca, Fe, Mg, Mn * No Hg 245.1

Customer, IMPORTANT! Please indicate desired turnaround.

[22]Requested Turnaround

21 Days ___X___

*7 Days ___

*48 Hr ___

*Vendor Lab 13 Days ___X___

12/13/12

APPLIED SPECIATION
AND CONSULTING, LLC

18804 Northcreek Parkway Bothell, WA, 98011
Tel: (425) 483-3300 Fax: (425) 483-9818
www.appliedspeciation.com

December 13, 2012

Jay Perkins
Duke Energy Analytical Laboratory
Mail Code MGO3A2 (Building 7405)
13339 Hagers Ferry Rd.
Huntersville, NC 28078
(704) 875-5245

Project: Belews Creek (Flex Fuel) - WW (LIMS #J12110391)

Dear Mr. Perkins,

Attached is the report associated with four (4) aqueous samples submitted for selenium speciation on November 29, 2012. The samples were received in a sealed cooler at -0.5°C on November 30, 2012. Selenium speciation analysis was performed via ion chromatography inductively coupled plasma collision reaction cell mass spectrometry (IC-ICP-CRC-MS). Any issues associated with the analysis are addressed in the following report.

If you have any questions, please feel free to contact me at your convenience.

Sincerely,

Russell Gerads
Vice President
Applied Speciation and Consulting, LLC

Applied Speciation and Consulting, LLC

Report prepared for:

Jay Perkins
Duke Energy Analytical Laboratory
Mail Code MGO3A2 (Building 7405)
13339 Hagers Ferry Rd.
Huntersville, NC 28078

Project: Belews Creek (Flex Fuel) - WW (LIMS #J12110391)

December 13, 2012

1. Sample Reception

Four (4) aqueous samples in 125mL HDPE bottles (provided by Applied Speciation and Consulting) were submitted for selenium speciation analysis on November 29, 2012. The samples were received on November 30, 2012 in a sealed container at -0.5°C.

The samples were received in a laminar flow clean hood, void of trace metals contamination and ultra-violet radiation, and were designated discrete sample identifiers. An aliquot of each sample was filtered (0.45µm) and each filtrate was stored in a secure, monitored cryofreezer (maintained at a temperature of -80^{o}C) until selenium speciation analysis could be performed via ion chromatography inductively coupled plasma collision reaction cell mass spectrometry (IC-ICP-CRC-MS).

2. Sample Preparation

All sample preparation is performed in laminar flow clean hoods known to be free from trace metals contamination. All applied water for dilutions and sample preservatives are monitored for contamination to account for any biases associated with the sample results.

Selenium Speciation Analysis by IC-ICP-CRC-MS Prior to analysis, an aliquot of each sample was filtered with a syringe filter (0.45µm) and injected directly into an autosampler vial. No further sample preparation was performed as any chemical alteration of a sample may shift the equilibrium of the system, resulting in changes in speciation ratios.

3. Sample Analysis

All sample analysis is preceded by a minimum of a five-point calibration curve spanning the entire concentration range of interest. Calibration curves are performed at the beginning of

each analytical day. All calibration curves, associated with each species of interest, are standardized by linear regression resulting in a response factor. All sample results are **instrument blank corrected** to account for any operational biases associated with the analytical platform.

Prior to sample analysis, all calibration curves are verified using second source standards which are identified as initial calibration verification standards (ICV).

Ongoing instrument performance is identified by the analysis of continuing calibration verification standards (CCV) and continuing calibration blanks (CCB) at a minimum interval of every ten analytical runs.

Selenium Speciation Analysis by IC-ICP-CRC-MS Each sample for selenium speciation analysis was analyzed by ion chromatography inductively coupled plasma collision reaction cell mass spectrometry (IC-ICP-CRC-MS) on December 1, 2012. An aliquot of each sample is injected onto an anion exchange column and mobilized by a basic (pH > 7) gradient. The eluting selenium species are then introduced into a radio frequency (RF) plasma where energy-transfer processes cause desolvation, atomization, and ionization. The ions are extracted from the plasma through a differentially-pumped vacuum interface and travel through a pressurized chamber (CRC) containing a reaction gas which preferentially reacts with interfering ions of the same target mass to charge ratios (m/z). A solid-state detector detects ions transmitted through the mass analyzer and the resulting current is processed by a data handling system.

Retention times for each eluting species are compared to known standards for species identification.

4. Analytical Issues

The overall analyses went well and no significant analytical issues were encountered. All quality control parameters associated with the samples were within acceptance limits.

The estimated method detection limits (eMDLs) for selenite, selenate, and selenocyanate are generated from replicate analyses of the lowest standard in the calibration curve. Not all selenium species are present in preparation blanks; therefore, eMDL calculations based on preparation blanks are artificially biased low.

The eMDL for methylseleninic acid and selenomethionine is calculated from the average eMDL of selenite, selenate, and selenocyanate. The calibration does not contain methylseleninic acid or selenomethionine due to impurities in these standards which would bias the results for other selenium species.

If you have any questions or concerns regarding this report, please feel free to contact me.

Sincerely,

Russell Gerads
Vice President
Applied Speciation and Consulting, LLC

Selenium Speciation Results for Duke Energy
Project Name: Belews Creek (Flex Fuel) - WW
Contact: Jay Perkins
LIMS #J12110391

Date: December 13, 2012
Report Generated by: Russell Gerads
Applied Speciation and Consulting, LLC

Sample Results

Sample ID	Se(IV)	Se(VI)	SeCN	MeSe(IV)	SeMe	Unknown Se Species (n)
FGD Purge Eff	157	58.3	5.8	2.2	ND (<1.8)	12.1 (2)
BioReactor 1 Inf	131	54.5	ND (<0.51)	7.13	ND (<0.45)	0.51 (1)
BioReactor 2 Inf	4.45	ND (<0.63)	ND (<0.51)	ND (<0.45)	ND (<0.45)	0.0 (0)
BioReactor 2 Eff	0.36	ND (<0.63)	ND (<0.51)	ND (<0.45)	ND (<0.45)	0.0 (0)

All results reflect the applied dilution and are reported in µg/L
ND = Not detected at the applied dilution
SeCN = Selenocyanate
MeSe(IV) = Methylseleninic acid
SeMe = Selenomethionine
Unknown Se Species = Total concentration of all unknown Se species observed by IC-ICP-MS

Selenium Speciation Results for Duke Energy
Project Name: Belews Creek (Flex Fuel) - WW
Contact: Jay Perkins
LIMS #J12110391

Date: December 13, 2012
Report Generated by: Russell Gerads
Applied Speciation and Consulting, LLC

Quality Control Summary - Preparation Blank Summary

Analyte (µg/L)	PBW1	PBW2	PBW3	PBW4	Mean	StdDev	eMDL*	eMDL 250x	eMDL 1000x
Se(IV)	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.22	0.86
Se(VI)	0.000	0.000	0.000	0.000	0.000	0.000	0.003	0.63	2.5
SeCN	0.000	0.000	0.000	0.000	0.000	0.000	0.002	0.51	2.0
MeSe(IV)	0.000	0.000	0.000	0.000	0.000	0.000	0.002	0.45	1.8
SeMe	0.000	0.000	0.000	0.000	0.000	0.000	0.002	0.45	1.8

eMDL = Estimated Method Detection Limit
*Please see narrative regarding eMDL calculations

Quality Control Summary - Certified Reference Materials

Analyte (µg/L)	CRM	True Value	Result	Recovery
Se(IV)	LCS	9.57	9.57	100.0
Se(VI)	LCS	9.48	9.23	97.3
SeCN	LCS	8.92	8.78	98.4
MeSe(IV)	LCS	6.47	6.15	95.1
SeMe	LCS	9.32	8.78	94.2

Selenium Speciation Results for Duke Energy
Project Name: Belews Creek (Flex Fuel) - WW
Contact: Jay Perkins
LIMS #J12110391

Date: December 13, 2012
Report Generated by: Russell Gerads
Applied Speciation and Consulting, LLC

Quality Control Summary - Matrix Duplicates

Analyte (µg/L)	Sample ID	Rep 1	Rep 2	Mean	RPD
Se(IV)	Batch QC	0.33	0.26	0.30	21.8
Se(VI)	Batch QC	ND (<0.63)	ND (<0.63)	NC	NC
SeCN	Batch QC	ND (<0.51)	ND (<0.51)	NC	NC
MeSe(IV)	Batch QC	ND (<0.45)	ND (<0.45)	NC	NC
SeMe	Batch QC	ND (<0.45)	ND (<0.45)	NC	NC

ND = Not detected at the applied dilution
NC = Value was not calculated due to one or more concentrations below the eMDL

Quality Control Summary - Matrix Spike/ Matrix Spike Duplicate

Analyte (µg/L)	Sample ID	Spike Conc	MS Result	Recovery	Spike Conc	MSD Result	Recovery	RPD
Se(IV)	Batch QC	1390	1501	108.0	1390	1499	107.8	0.2
Se(VI)	Batch QC	1261	1337	106.0	1261	1326	105.1	0.8
SeCN	Batch QC	1144	1192	104.3	1144	1191	104.1	0.1

CHAIN OF CUSTODY RECORD AND ANALYSIS REQUEST FORM

Duke Energy

Duke Energy Analytical Laboratory
Mail Code MGO3A2 (Building 7405)
13339 Hagers Ferry Rd
Huntersville, N. C. 28078
(704) 875-5245
Fax: (704) 875-4349

Analytical Laboratory Use Only

LIMS # J 121103a | Matrix: OTHER | Samples Originating From: NC X SC ___

Logged By: JL | Date & Time: 11/27/12 1058 | SAMPLE PROGRAM: Ground Water ___ NPDES ___ Drinking Water ___ UST ___ RCRA ___ Waste ___

Vendor: | Cooler Temp (C): 8.1

DISTRIBUTION
ORIGINAL to LAB,
COPY to CLIENT

Page 20 of 7

Customer must Complete

[1]Project Name: Belews Creek (Flex Fuel) - WW		[2]Phone No:	
[2] Client: Melonie Martin, Wayne Chapman, Tom Johnson, Bill Kennedy		[4]Fax No:	
[5]Project: MBCFFLX01	[6]Account:	Mail Code:	
[8]Oper. Unit: BC01	[9]Process: NEXHSTK	[10]Activity ID:	

Vendor: ASC, Brooks Rand

MR #:

[15]Preserv.: 1=HCl 2=H_2SO_4 3=HNO_3 4=Ice 5=None

[16]Analyses Required

Customer to complete all appropriate non-shaded areas.

Customer to complete appropriate columns to right!

LAB USE ONLY [11]Lab ID	Se Speciation Bottle ID	[13]Sample Description or ID	Date	Time	Signature	[17]Comp.	[18]Grab	TDS, TSS	Hg 1631 total and filtered V_Brand	Metals + Hg 245.1*	Mn (ICP), Se (IMS) filtered	Se, Speciation, V_ASC	Chloride, Sulfate, Bromide, - Dionex
121125290		FGD Purge Eff	11-23	7:30	Travis Thornton			1		1	1	1	1
121125291		EQ Tank		7:35						1	1		
121125292		BioReactor 1 Inf		7:40					1	1*	1	1	
121125293		BioReactor 1 Inf Hg Blk		7:40					1				
121125294		BioReactor 2 Inf		7:45					1	1*	1	1	
121125295		BioReactor 2 Inf Hg Blk		7:45					1				
121125296		BioReactor 2 Eff		7:50					1	1*	1	1	1
121125297		BioReactor 2 Eff Hg Blk		7:50					1				
121125298		Filter Blank		08:00							1		
												Filter Mn and Se in the field	
												Lab, return kit to Tom Johnson	

Customer to sign & date below - fill out from left to right.

1) Relinquished By: Travis Thornton	Date/Time: 11-23-12 08:45	2) Accepted By:	Date/Time: 11/27/12 1045
3) Relinquished By:	Date/Time:	4) Accepted By: Donny Culbreth	Date/Time: 11/30/12 9:55 Temp 0.5c
5)Relinquished By:	Date/Time:	6)Accepted By:	Date/Time:
7)Relinquished By:	Date/Time: 11/29/12	8)Accepted By:	Date/Time:
9)Seal/Locked By:	Date/Time: 11/29/12	10) Seal/Lock Opened By	Date/Time:
11)Seal/Locked By	Date/Time:	12)Seal/Lock Opened By	Date/Time:

Comments: * Metals=TRM/IMS = As, Cd, Cr, Cu, Ni, Se, Ag, Zn TRM/ICP = B, Ca, Fe, Mg, Mn * No Hg 245.1

Customer, IMPORTANT! Please indicate desired turnaround.

[22]Requested Turnaround

21 Days ___X___

*7 Days ___

*48 Hr ___

*Vendor Lab 13 Days ___X___

12/13/12

CHAIN OF CUSTODY RECORD AND ANALYSIS REQUEST FORM

Duke Energy Analytical Laboratory
Mail Code MGO3A2 (Building 7405)
13339 Hagers Ferry Rd
Huntersville, N. C. 28078
(704) 875-5245
Fax: (704) 875-4349

Analytical Laboratory Use Only

LIMS # J 121103a1 | Matrix: OTHER | Samples Originating From: NC X SC
Logged By: JT | Date & Time: 11/27/12 1058
Vendor | Cooler Temp (C): 8.1
SAMPLE PROGRAM: Ground Water NPDES ___ Drinking Water ___ UST ___ RCRA ___ Waste ___
Vendor: ASC, Brooks Rand
MR #

[19]Page 1 of 1

DISTRIBUTION
ORIGINAL to LAB,
COPY to CLIENT

Customer must Complete

[1]Project Name: Belews Creek (Flex Fuel) - WW		[2]Phone No:
[2] Client: Melonie Martin, Wayne Chapman, Tom Johnson, Bill Kennedy		[4]Fax No:
[5]Project: MBCFFLX01	[6]Account:	Mail Code:
[8]Oper. Unit: BC01	[9]Process: NEXHSTK	[10]Activity ID:

Customer to complete all appropriate non-shaded areas.

[15]Preserv.: 1=HCL 2=H_2SO_4 3=HNO_3 4=Ice 5=None

[16]Analyses Required

LAB USE ONLY [11]Lab ID	Se Speciation Bottle ID	[13]Sample Description or ID	Date	Time	Signature	[17]Comp.	[18]Grab	TDS, TSS (4)	Hg 1631 total and filtered V_Brand (4)	Metals + Hg 245.1* (3)	Mn (ICP), Se (IMS) filtered (3)	Se, Speciation, V_ASC (4)	Chloride, Sulfate, Bromide, - Dionex (4)
201205290		FGD Purge Eff	11-23	7:30	Travis Thornton			1		1	1	1	1
201205291		EQ Tank		7:35						1	1		
201205292		BioReactor 1 Inf		7:40					1	1*	1	1	
201205293		BioReactor 1 Inf Hg Blk		7:40					1				
201205294		BioReactor 2 Inf		7:45					1	1*	1	1	
201205295		BioReactor 2 Inf Hg Blk		7:45					1				
201205296		BioReactor 2 Eff		7:50					1	1*	1	1	1
201205297		BioReactor 2 Eff Hg Blk		7:50					1				
201205298		Filter Blank		08:00							1		

Filter Mn and Se in the field

Lab, return kit to Tom Johnson

Customer to complete appropriate columns to right

Customer to sign & date below - fill out from left to right.

1) Relinquished By: Travis Thornton	Date/Time: 11-23-12 08:45	2) Accepted By:	Date/Time: 11/27/12 1045
3) Relinquished By:	Date/Time:	4) Accepted By:	Date/Time:
5)Relinquished By:	Date/Time:	6)Accepted By:	Date/Time:
7)Relinquished By:	Date/Time: 11/29/12	8)Accepted By:	Date/Time:
9)Seal/Locked By:	Date/Time: 11/29/12	10) Seal/Lock Opened By	Date/Time:
11)Seal/Locked By	Date/Time:	12)Seal/Lock Opened By	Date/Time:

Comments

* Metals=TRM/IMS = As, Cd, Cr, Cu, Ni, Se, Ag, Zn TRM/ICP = B, Ca, Fe, Mg, Mn * No Hg 245.1

Customer, IMPORTANT: Please indicate desired turnaround.

[22]Requested Turnaround

21 Days ___X___
*7 Days ___
*48 Hr ___
*Vendor Lab 13 Days ___X___

12/13/12

2